1. For the scenario below, use the model for the volume of a cylinder as $V = \pi r^2 h$.

   Pringles wants to add 33 percent more chips to their cylinder cans and minimize the design change of their cans. They've decided that the best way to minimize the design change is to increase the radius and height by the same percentage. What should this increase be?

   A. About 15 percent

   B. About 10 percent

   C. About 11 percent

   D. About 16 percent

   E. None of the above

2. Solve the modeling problem below, if possible.

   A new virus is spreading throughout the world. There were initially 4 many cases reported, but the number of confirmed cases has doubled every 1 days. How long will it be until there are at least 10000 confirmed cases?

   A. About 4 days

   B. About 5 days

   C. About 12 days

   D. About 8 days

   E. There is not enough information to solve the problem.

3. The temperature of an object, T, in a different surrounding temperature T_s will behave according to the formula $T(t) = Ae^{kt} + T_s$, where t is minutes, A is a constant, and k is a constant. Use this formula and the situation below to construct a model that describes the uranium's temperature, T, based on the amount of time t (in minutes) that have passed. Choose the correct constant k from the options below.

Uranium is taken out of the reactor with a temperature of $120°$ *C and is placed into a* $13°$ *C bath to cool. After 18 minutes, the uranium has cooled to* $60°$ *C.*

A. $k = -0.03696$

B. $k = -0.05207$

C. $k = -0.04570$

D. $k = -0.03771$

E. None of the above

4. Determine the appropriate model for the graph of points below.
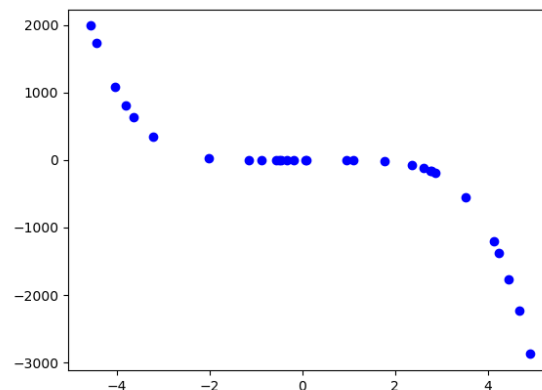
A. Exponential model

B. Logarithmic model

C. Linear model

D. Non-linear Power model

E. None of the above

5. For the scenario below, use the model for the volume of a cylinder as $V = \pi r^2 h$.

Pringles wants to add 49 percent more chips to their cylinder cans

and minimize the design change of their cans. They've decided that the best way to minimize the design change is to increase the radius and height by the same percentage. What should this increase be?

A. About 22 percent

B. About 24 percent

C. About 4 percent

D. About 14 percent

E. None of the above

6. Solve the modeling problem below, if possible.

In CHM2045L, Brittany created a 29 liter 23 percent solution of chemical χ using two different solution percentages of chemical χ. When she went to write her lab report, she realized she forgot to write the amount of each solution she used! If she remembers she used 17 percent and 33 percent solutions, what was the amount she used of the 17 percent solution?

A. 14.50*liters*

B. 13.10*liters*

C. 10.88*liters*

D. 18.12*liters*

E. There is not enough information to solve the problem.

7. For the scenario below, use the model for the volume of a cylinder as $V = \pi r^2 h$ to find the coefficient for the model of the new volume $V_{\text{new}} = kr^2 h$.

Pepsi wants to increase the volume of soda in their cans. They've decided to decrease the radius by 20 percent and increase the height by 16 percent. They want to model the new volume based on the radius and height of the original cans.

A. $k = 0.74240$

B. $k = 2.33232$

C. $k = 0.02011$

D. $k = 0.00640$

E. None of the above.

---

8. Solve the modeling problem below, if possible.

In CHM2045L, Brittany created a 28 liter 22 percent solution of chemical χ using two different solution percentages of chemical χ. When she went to write her lab report, she realized she forgot to write the amount of each solution she used! If she remembers she used 5 percent and 34 percent solutions, what was the amount she used of the 34 percent solution?

A. $12.23 liters$

B. $14.00 liters$

C. $16.41 liters$

D. $11.59 liters$

E. There is not enough information to solve the problem.


9. Solve the modeling problem below, if possible.

A new virus is spreading throughout the world. There were initially 6 many cases reported, but the number of confirmed cases has tripled every 2 days. How long will it be until there are at least 100000 confirmed cases?

A. About 8 days

B. About 20 days

C. About 18 days

D. About 9 days

E. There is not enough information to solve the problem.

10. Determine the appropriate model for the graph of points below.
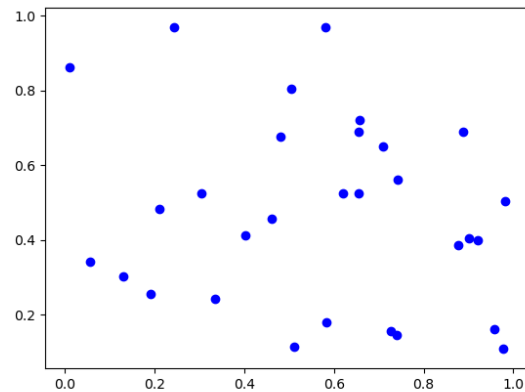
A. Exponential model

B. Linear model

C. Logarithmic model

D. Non-linear Power model

E. None of the above